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THE HORN SPEAKER

The first and the standard monthly publication for radio collectors since 1972

Radio News for October, 1924

Pilot Interviewed by Radio While Flying

By A. M. JACOBS

Of United States Army Air Service

"JOHNNIE," said a mother in a comic weekly some months ago, "run in and radio your father that there's a gentleman down here to see him. He just went into that pink cloud."

It's a fast moving age. That which is in the realm of possibility in a flash becomes reality; reality soon becomes history. Yesterday we made the joke come true.

We saw Lieut. A. L. Johnson, McCook Field aviator, take off in his DH P-292 Army plane and head for the clouds. There were plenty of them—though none were pink—and the airplane was soon lost to view. Casually we strolled into the McCook Field Laboratory where "Pop" Leland sat before a ground station radio set.

"Lieut. Johnson is 'up,'" we said, "could we talk to him?"

"Pop" started the motor generator and threw some switches, putting the set in operation.

"Hello—hello—hello," we heard him call into a hand telephone in the most approved radio voice. "This is A-W-5 talking. Somebody wants to speak to Lieut. Johnson. Can you hear me, Johnson? Come in—come in—come in."

Then from the moving plane somewhere in the clouds, out of sight, came faintly and scratchily at first as if through a struggle, but unmistakably familiar, Lieut. Johnson's voice.

"Hello—hello—A-W-5, Lieut. Johnson speaking. Can hear but cannot understand very well—seems to be a great deal of static. Try again."

"Pop" tried again. There was more turning of dials and talking, then we were handed the telephone and the head piece, while "Pop's" nod seemed to indicate that all was very well.

"Hello, Lieut. Johnson," we said, "can you hear us? If so, we'd like to know where you are just now and how the weather is up there."

A TEST

Clearly, as if in the same room, Lieut. Johnson's voice came back. "We are flying over New Lebanon, Ohio, at an altitude of about 4,000 feet and are climbing steadily to get above the clouds. The clouds are very thick this afternoon, scattered from 3,000 to 6,000 feet in height. The thermometer registers 45 degrees, which with our suits and helmets makes a comfortable flying temperature. We are traveling at a speed of 80 miles an hour. Now we have climbed to about 5,000 feet and are in clear sunshine, although New Lebanon lies hidden below. Dayton lies to the east of us, but we cannot see it. We are now over West Carrolton. Can you hear me?"

We: "We can hear you distinctly, Lieut. Johnson. With what kind of radio set is your plane equipped?"

"Lt. Johnson: "It is known as type SCR-134. The receiving unit is a Super-Heterodyne with peanut tubes. The set is shielded in order that the ignition noises of the engine may be cut out. We carry a trailing wire antenna with a 5-pound lead weight. The metal parts of the plane, the wires of the fuselage and the wings are all connected together and act as a counterpoise. In principle, of course, it is the ordinary transmitter and receiver used the world over, but there have had to be special adaptations to make it serviceable and practical for air use, and these details have been worked out by the Signal Corps and tested at McCook Field. Does that answer your question?"

We: "Quite completely. Where are you now?"

Lt. Johnson: "We have been approaching Xenia, Ohio, and are now above it. The clouds are very sloping and broken. They are apparently headed for the north—at least the wind seems to be carrying them that way. We are now at a bank of cumulus clouds several thousand feet high. We will go over them. Up we go! Up along the side of the bank! Now we are at the top—and down we go—down the other side at a speed of 110 miles per hour. Dayton now lies to the left and Xenia to the right. Could you hear me distinctly during the climbing and diving of the plane?"

We: "Very distinctly. There was no change in sound, whatever."

Lt. Johnson: "I am now circling around another cumulus cloud. Now I am about to enter the cloud—now I am in the middle of it. I can see nothing. Is there any difference in sound?"

Radio News for October, 1924

This illustration shows the radio installation aboard an airplane. The observing officer operates the set, current for which is supplied by a wind-driven dynamo mounted on one of the wings. The aerial is a single wire hanging under the plane.

We: "None whatever. What are these direction finding sets for pilots that we hear of?"

DIRECTION FINDER

Lt. Johnson: "That is a radio development also, the airplane adaptations of which have been largely worked out at McCook Field. Suppose an airplane were flying from Washington to Dayton by night, or in a storm, so that it was impossible for the pilot to keep to the course with the customary land marks. The radio direction finder will guide him directly from one point to another in this way: The ground station sends out signals, so directed that they are most distinct along the line of the course. The pilot finding his signals becoming indistinct would know that he was leaving his course and would turn his plane until he found the signals distinct once more. With this system the airplane need to carry no transmitter, only a receiving set. This is, of course, the simplest of these systems. There is also what we call the equi-signal system. Two signals of equal wave-length are sent along the line of the course. When the pilot leaves the course, one of the signals becomes louder while the other dies away, so that he is warned to reset the nose of his plane and keep on the line of equal signals if he would come safely to his airdrome. Radio for the airplane is still in its infancy. But these developments are improvements that are making flying safer day by day, against all sorts of hazards and under all sorts of conditions. We are now over Wilbur Wright Field and the Huffman Dam. Since talking to you we have flown over New Lebanon, West Carrolton, Xenia, Wilbur Wright Field, and we are now headed for McCook Field. If there are no bill collectors about, we'll come down."

We: "The coast is clear. This has been quite interesting, Lieut. Johnson, and it would seem to prove that if one wants to interview a pilot while flying, one must work fast."

Lt. Johnson: "You bet."

We strolled out of doors. There were several planes against the sky. At the distance from the ground of even the lowest one, it was impossible to distinguish any sign of a pilot, any sign of human beings within them. Even the sound of their motors came softened through the spaces.

It's a fast moving age!

NOTES

SYMPTOMS

A FADING COLONIAL 33

THE above set was brought into the the shop labeled, "fades." A check of the tubes showed two 24s as very noisy when tapped due to loose elements. These two tubes were replaced and the set ran for an hour without a trace of fading. It was returned to the customer. Next day the same set came back to the shop with the same label, "fades." When hooked up and run for about 30 minutes it started fading, would fade nearly clear out and then back to full volume. A second check of the voltages with the set fading failed to show any variation in plate, grid, screen or filament voltages. Nevertheless each bypass condenser and each resistor was replaced one at a time, without results. Next the set was turned off and an ohmmeter check of all units made. During this test the primary of the first audio transformer showed an intermittent open. When this unit was replaced the set was O.K. See Fig. 1.

M. NELMS

A.V.C. ON THE KOLSTER K-80 AND K-82

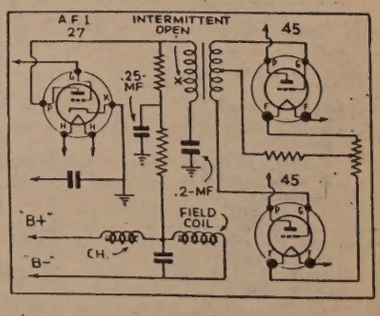
ONE of the most aggravating jobs which I have ever encountered is the "time lag" feature in the Kolster K-80 and K-82 volume control.

A glance at the circuit diagram, Fig. 2, shows that the manual volume control functions in the grid-return circuit of the type 24 A.V.C. tube. Changing tubes is the first thought which occurs, but it just doesn't work.

An analysis of the circuit leads to the belief that the A.V.C. tube is losing bias due to the high resistance (2 megohms, R11) in the circuit. Following this idea, the thought occurred that it was also probable that the plate resistance (2 megohms, R12) was too high. Just how accurate the line of thought may have been is somewhat immaterial, for the fact remains that changing these two resistors for 1 megohm, 1 W. units, promptly cleared up the trouble.

JAMES H. SLEDD

Fig. 1, below. Intermittent "open" in primary of Colonial output transformer.



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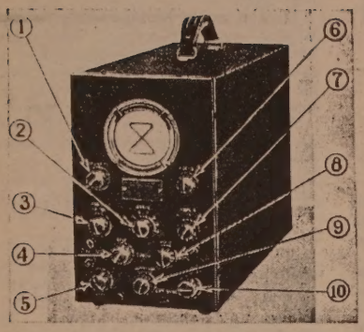


The controls on a commercial cathode-ray oscilloscope: 1—Intensity; 2—Range; 3—Amplifier A, Sw.; 4—Vertical Timing; 5—Gain; 6—Focus; 7—Amplifier B, Sw.; 8—Horizontal Timing; 9—External Synchronizing; 10—Sync. Gain Control. (Photo: RCA)

A continuation of the history and fundamental study of the oscilloscope as a service and engineering measuring instrument. Some practical hints are included on operating and handling these tubes.

FUNDAMENTAL FACTS ABOUT CATHODE-RAY TUBES

E. B. PATTERSON*

A. WEHNELT in 1905 developed a *hot* cathode tube which was a distinct advance over the earlier type. It consisted of a line-spot source and contributed to the fineness and intensity of the stream by limiting the initial diameter of the stream and causing the effective part of the accelerating field to be parallel. Since a hot cathode created a copious supply of electrons, it was possible to use a lower potential on the tube, which greatly increased the sensitivity as the speed of the ray was reduced.

(The original cathode-ray tubes employed a *cold* cathode and a circular anode having a small hole in its center. Accelerating voltages from 10,000 to 20,000 were required, in order to produce the rays by bombardment. An explanation of just how this set-up could produce cathode rays is of interest.

A few gas molecules, positive ions, and free electrons are always found in the tube. Consequently, the application of a strong field causes the positive ions to be attracted toward the cathode. These ions, however, collide with neutral gas molecules and electrons are knocked out. The positive ions which strike the cold cathode in turn liberate electrons which constitute the cathode beam emanating toward the anode.)

OPERATING CONSIDERATIONS

In dealing with modern cathode-ray tubes having brilliant spots (due to high anode voltage and improved screen fluorescence) there are certain precautions to be observed. One is that the beam should not be allowed to remain idle or it may cause deterioration of the screen (cause the screen to blacken).

A better idea of the tremendous impact of the electron stream against the screen is gained upon realizing that the electron stream bombards the screen much as machine-gun bullets would pepper a target, except that the latter projectile has a muzzle velocity of only about 2,000 miles per hour, against a velocity for the former "missile" (electron), at 1000 volts, of approximately 42 million miles per hour!

FUNDAMENTAL CIRCUIT

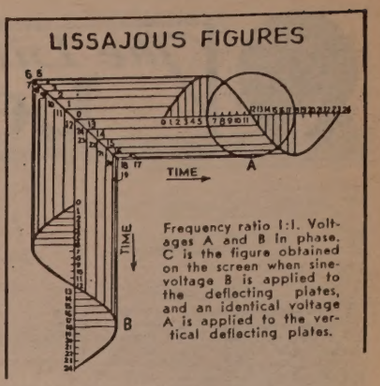
A typical diagram of a modern tube, and its fundamental connections are shown in Fig. 3. (An oscilloscope incorporating this tube and general circuit is shown in the pictorial illustration.) For simplicity, the circuit is shown without the details of power supply, or plate-deflecting voltages.

This tube utilizes electrostatic deflection plates and each set of plates is separated from the other—there being no internal connection to ground between the horizontal and the vertical plates, as found in some of the earlier (as well as some present) types. This permits greater freedom in the use of the tube for measurement purposes.

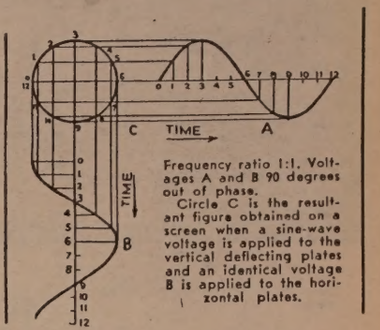
In Fig. 4 are shown additional Lissajous figures to those shown last month. The Service Man, and the technician who is keeping abreast of the times, will do well to study these figures as they hold the key to an understanding of the more complex patterns that appear in making circuit adjustments, and in testing various pieces of apparatus.

The cathode-ray oscilloscope (illustrated) and oscillograph are powerful tools, superior to other forms of wave-form analysis devices since this class of instrument utilizes an electron stream which acts on and obeys the same laws as a flexible conductor with the current flowing toward the cathode. It is reasonable to suppose that this new tube, now produced at very low cost, will soon be on the same plane of general usage as ordinary meters, thus removing this academic instrument from the laboratory and placing it in the hands of the average radio technician.

(Credit is here given to BROADCAST NEWS and RCA Radiotron for the use of reference material and illustrations.)

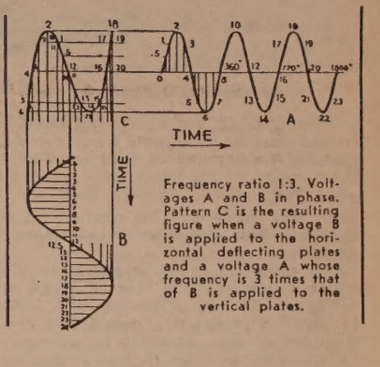


Frequency ratio 1:1. Voltages A and B in phase. C is the figure obtained on the screen when sine-voltage B is applied to the deflecting plates, and an identical voltage A is applied to the vertical deflecting plates.

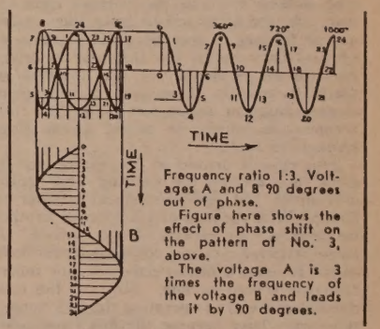


Frequency ratio 1:1. Voltages A and B 90 degrees out of phase.

Circle C is the resultant figure obtained on a screen when a sine-wave voltage is applied to the vertical deflecting plates and an identical voltage B is applied to the horizontal plates.



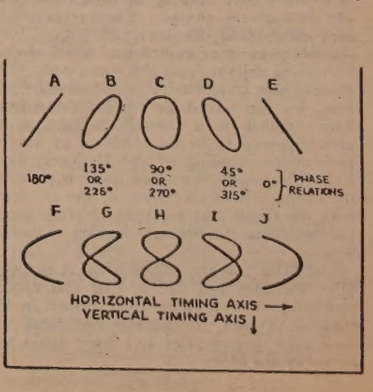
Frequency ratio 1:3. Voltages A and B in phase. Pattern C is the resulting figure when a voltage B is applied to the horizontal deflecting plates and a voltage A whose frequency is 3 times that of B is applied to the vertical plates.



Frequency ratio 1:3. Voltages A and B 90 degrees out of phase.

Figure here shows the effect of phase shift on the pattern of No. 3, above.

The voltage A is 3 times the frequency of the voltage B and leads it by 90 degrees.



BROAD TUNING COMPLAINT WITH ZENITH 705

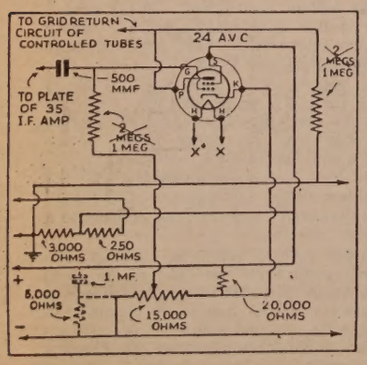
THOSE who live in the south and own or service this model will find the most common complaints to be broad tuning and inability to get any stations other than locals in the daytime. The set has a small amount of Q.A.V.C. due to the bias resistor in the cathode of the 2A6 tube (5,400 ohms). Remove this resistor, and also the 5 mf. 20 V. condenser from the cathode, and ground the cathode of the 2A6, then peak the I.F. stage and R.F. condenser and you will find it to be an entirely different set. This also applies to the model 715 with the shadowgraph.

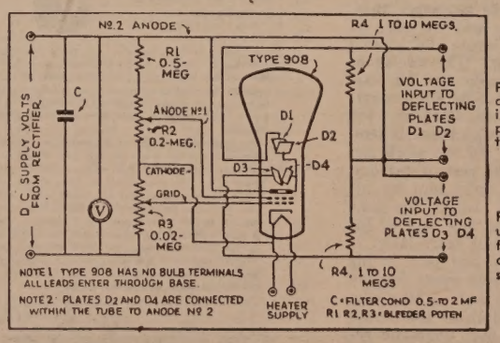
MOTOROLA MODEL 44

ON ALL these models that have a 500 ohm (green) resistor connected from cathode to ground of the 75 tube, you will increase the pickup and also give the set a better tone if you parallel another 500 ohm resistor across this one or remove it and replace it with a 250 ohm resistor. Note: Some models already have it that way.

HARRY L. CHANEY

Fig. 2. Changes In Kolster K-80 and K-82.





Left—

Fig. 3—A typical oscilloscope circuit showing the method of connecting the D.C. bias and the two A.C. potentials to be analyzed, that is, the sweep potential and the unknown.

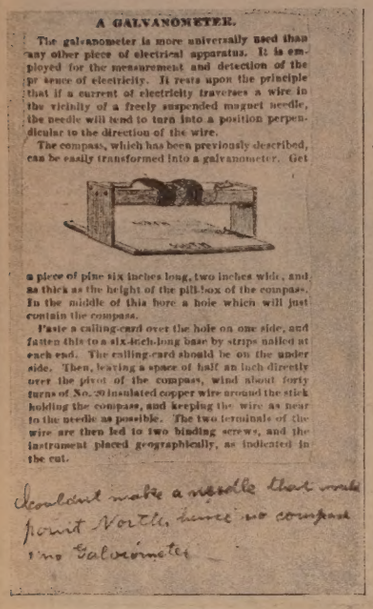
Right—

Fig. 4—More of Lissajous figures upon which the comparison of wave forms depends. The radio man who contemplates the use of an oscilloscope should memorize these figures.

*Engineer, RCA Mfg. Co., Inc., Victor Div.

The Life and Work of Lee DeForest

(Continued from last month)



A GALVANOMETER.

The galvanometer is more universally used than any other piece of electrical apparatus. It is employed for the measurement and detection of the presence of electricity. It rests upon the principle that if a current of electricity traverses a wire in the vicinity of a freely suspended magnet needle, the needle will tend to turn into a position perpendicular to the direction of the wire.

The compass, which has been previously described, can be easily transformed into a galvanometer. Get

a piece of pine six inches long, two inches wide, and as thick as the height of the pill-box of the compass. In the middle of this bore a hole which will just contain the compass.

Paste a calling-card over the hole on one side, and fasten this to a six-inch-long base by strips nailed at each end. The calling-card should be on the under side. Then, leaving a space of half an inch directly over the pivot of the compass, wind about forty turns of No. 20 insulated copper wire around the stick holding the compass, and keeping the wire as near to the needle as possible. The two terminals of the wire are then led to two binding screws, and the instrument placed geographically, as indicated in the cut.

Should not make a needle that will point North, since no compass in a Galvanometer

A galvanometer from DeForest's note book.

Other times he would reproduce machines he had seen in his travels about the surrounding country and on trips he made in the company of his father, who traveled a great deal. Near Talladega there was a large blast furnace. This received his attention a short time after he was taken to the town.

One afternoon, while he and his brother with a couple of "nigs" (as he always referred to the Negro children with whom he played a great deal) started to a creek a few miles away ostensibly for swimming. On the way, in order to take a short-cut, they walked down to the railroad right-of-way. A few miles out of town they passed a blast furnace in operation. The remainder of the diary entry for that day is given over to an exposition of the wonders of the blast furnace. This same smelting plant is the cause for many entries and for one accident in which he might easily have broken his neck.

This episode proved so interesting that he could not confine the copying and reproduction of the new mechanical wonder to paper. With the help of his younger brother he constructed a replica of the furnace. A large, battered ash-can constituted the body of the fire-pot, while an elaborate pine superstructure served as flue. Most of the time the furnace was in operation the two youngsters were busy keeping the flue from passing on with the charge. The furnace operated successfully, however, and poured forth a small quantity of molten lead which elicited shrieks of delight from the youngsters. The delight was comparatively short-lived, however, for the forced air draft for the flame was supplied by a chimney bellows which also happened to be an heirloom of several generations standing of the DeForest family. The youngsters were more careful of the chimney than they were of the air draft with the result that a supply of crude metal ran back into the bellows, leaving it a total loss.

The blast furnace fell terribly in prestige after the sons had had a long and epoch-making conference with their father in his study. At least, it was removed from the back yard shortly after and never again put in an appearance.

EXACT KNOWLEDGE

As with the blast furnace, nothing seemed to interest Lee unless he could examine it thoroughly and find out *exactly* why it worked.

Sometimes, as in the case of the blast furnace, he did not thoroughly assimilate the facts concerning the piece of apparatus at his first view of it. In such cases he returned to the machine again and again in an attempt to master it, finally achieving the desired result.

It could hardly be said that he was greatly imaginative. Rather he gained his ends by hard work. There is hardly a case of his meeting a new theory or idea and mastering it immediately. His mind simply does not work that way. He takes it slowly, piece by piece, and with the mastery of the detail reconstructs the whole.

This is clearly shown by his first encounter with a locomotive. In the town near which his father's school was located he was at the station one day when a train arrived. Of course, he understood the theory of the steam engine, but its application to a locomotive with reversing gears and the juxtaposition of air brake cylinders and oiling adjuncts floored him. There followed several trips to town.

Finally, after many studies of the thing, while the engineer was oiling up or the baggageman exchanging jokes with the station master, he saw it all. Immediately he started for home on a dead run crying under his breath, "I'm so happy, I'm so happy."

A few days later, the DeForest back yard saw another monster worse than the blast furnace bloom into existence. It was a complete replica (as complete and workable as could be made with the aid of pine boards, barrels, hand saw and hammer) of the locomotive including the all-important reversing gear.

This slow thoroughness follows throughout the whole of his life. With it, and possibly very much to his advantage, was an orderliness imbued by early training which worked constantly to make him a success.

The beginning of this orderliness—possibly it might better be called standardizing of routine—was, like most of his other characteristics, noticeable from earliest childhood. His father insisted that each of the children should perform a certain amount of the chores daily and that they take part in some sort of athletics. Day after day his journal carries the entry for splitting the kindling and currying the family horse. The only deviation comes when the horse got herself particularly dirty and caused him to write a tirade on her condition.

A TEMPER

He seemed to have quite a temper then. His first job after arising was the care of the mare and he always wrote the journal entries just before retiring. The twelve or fifteen hours lapsing between currying her and cleaning the manger had no effect whatever in softening his wrath when the job was unpleasant. There was no burst of temper. To the contrary, he did the work and harbored his choler for the rest of the day.

These duties bestowed upon him by his father he never questioned. In just the same fashion he did not question any part of his father's religious dogma until years later.

Religion played an important part in his early life. There was church every Sunday in which he took an active part. Those who are acquainted with the South of the period know the very important part dogmatic religion played in the social fabric of the times. After he passed the age of thirteen religion forced itself more and more into the foreground of his thinking, chiefly through the rigorous religious home life he led. Every Sunday afternoon was given over to reading the Bible and there was family prayer each morning. Before retiring he read the Bible.

As he grew older, the loneliness of his life forced him—not particularly against his will—into deeper and deeper study of his chosen line. From the time of adolescence until he entered prep school his reading became more and more constant and his experiments more and more pretentious. Novels formed a very small part of his interest. In fact, the only one mentioned in his notes or correspondence (which was extremely large) is the "Tale of Two Cities."

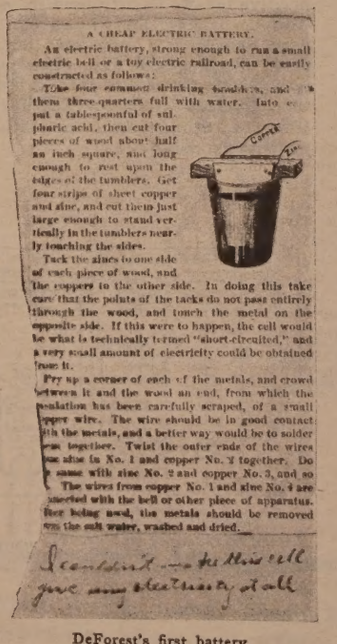
He read with delight, however, all of Cooper's "Leather Stocking Tales," his Sea Tales, and stories of Colonial history.

The mechanical illustrations of the dictionary were discovered and they gave no little interest. The library of the school contained very little along physical or electrical lines except a scientific journal (*Scientific American*) and the *Patent Office Report*. These he read with avidity, making notes of interesting facts he found in them.

The *Companion* ran a large premium list. One item given about the time De Forest was fifteen years old was a complete electroplating outfit. It could be procured with a number of subscriptions to the magazine. He decided to get it and started his subscription campaign. At first the results seemed sanguine but soon he had exhausted the list of his friends and was forced to go out among the "Rebs" for his soliciting. The territory around Talladega was one of poor culture and not at all wealthy. The going was hard and finally, in order to obtain the set, it was necessary for him to save pennies and dimes to assist the credit received from the subscriptions.

After receiving it he immediately began tests. Power was furnished by home-made primary cells.

After the outfit was in working order he took his revenge on the people who had refused to take subscriptions. They wanted



A CHEAP ELECTRIC BATTERY.

An electric battery, strong enough to run a small electric bell or a toy electric railroad, can be easily constructed as follows:

Take four common drinking goblets, and in them three-quarters full with water. Into each put a tablespoonful of sulphuric acid, then cut four pieces of wood about half an inch square, and long enough to rest upon the edges of the tumblers. Get four strips of sheet copper and zinc, and cut them just large enough to stand vertically in the tumblers nearly touching the sides.

Tack the zincs to one side of each piece of wood, and the coppers to the other side. In doing this take care that the points of the tacks do not pass entirely through the wood, and touch the metal on the opposite side. If this were to happen, the cell would be what is technically termed "short-circuited," and a very small amount of electricity could be obtained from it.

Fry up a corner of each of the metals, and crowd between it and the wood an end, from which the insulation has been carefully scraped, of a small copper wire. The wire should be in good contact with the metals, and a better way would be to solder them together. Twist the outer ends of the wires from zinc in No. 1 and copper No. 2 together. Do the same with zinc No. 2 and copper No. 3, and so on.

The wires from copper No. 1 and zinc No. 4 are connected with the bell or other piece of apparatus. After being used, the metals should be removed from the salt water, washed and dried.

Should not make a bell will give any electricity at all

DeForest's first battery.

spoons and silverware plated as they had seen some of their friends' plated and they must needs take them to DeForest.

It was with this outfit that he made his first dollar.

Here it might be interesting to note that he was always practical. With every new idea, new discovery, the question of practicality always thrust itself before him. With all his experiments he sought to find a practical purpose for which to use them.

After the advent of the electroplating apparatus other electrical experiments followed swiftly. There was a horse-shoe magnet that was really worthy of its name since it consisted of a real old, rusty, horse-shoe around the two legs of which were wound the necessary wire.

Then followed in rapid sequence the construction of a compass and galvanometer. The obliging college druggist furnished the case for the compass which took the form of the well known round pill box. The top of the box was removed and faced with glass. One of his mother's needles went to support the magnetic needle which was a piece of main-spring cut from an old clock. After the compass was completed, the wire came off the horse-shoe magnet and was rewound upon two supports for the galvanometer. The compass was placed between the coils and the addition of two wood screws for binding posts completed his first measuring instrument for electrical currents.

At the age of thirteen, DeForest's bent for electricity was well established—so well established, in fact, that his father began a sort of counter campaign in favor of the ministry and the classics. As a result of this campaign, Lee wrote his father a long and elaborate letter, painfully executed on his father's early typewriter, stating in unequivocal terms that it was his desire to follow his natural inclination to take up engineering and invention.

There is no indication in the facts known which would show the inception of this desire to invent. It was natural and evident from the first unfolding of his mind. It certainly must have been natural. It is hardly remarkable, however, since the history of the world's geniuses all followed an almost identical course.

His course was well defined before the writing of the letter mentioned above. After that, the matter was practically settled and his schooling was regulated accordingly, in as far as the curriculum of the schools he attended permitted.

While his education continued in Alabama there was little outlet for his mechanical activities. He continued reading such journals and books as he could find with the result that he definitely decided to become an electrical engineer and inventor long before he completed his other plans for prep. school. And always, when he mentioned his occupation as engineer the "inventor" was joined with it.

His development was rather lop-sided all during the period he spent at home. Although he took many trips with his father to all parts of the country, there was little in them save a glorification of what he constantly encountered at home. A continual round of religion and the classics sandwiched, here and there, with some enjoyable scientific adventure, formed a large part of his routine. Throughout it all, however, he was seldom recalcitrant. There seemed to be in him a veneration for the family with his father at its head which forbade him questioning the system.

One instance of his resenting it is shown clearly (and it is practically the only one). It was his last year at home before entering prep. school and his father insisted on his learning the fundamentals of Greek.

This decisoin brought forth a tirade that lasted for weeks. It was not shown publically, however, being confined entirely to a diary.

He had several conditions to make up before his entry for the class of '93 could be made at Mt. Hermon, Massachusetts, Preparatory School, and so the months following were crowded full of work. It was his plan to finish the course at Mt. Hermon in two years, with the assurance of credits he gained through the tutelage of his father.

This he did successfully and with extremely good grades.

FOURTH CELEBRATION

The South did not observe the Fourth of July in those days. The DeForest family being good Yankees, however, felt in duty bound to make the usual noisy celebration of their country's independence. No fireworks were obtainable in Talladega, so it devolved on Lee to manufacture the greater part of the family's pyrotechnical display. Some Roman Candles and pin-wheels were imported from the North and, with the assistance of a handful of shot-gun shells and a few fruit tins, the day was celebrated properly. During the day preceding, Lee repaired the flag pole at the college and made one for his home. On the morning of the Fourth flags were flown at both places.

As he returned from hoisting the one atop the college cupola a bunch of the "nasty little Rebs" gave chase, speeding him homeward, so he arrived with lots of time before breakfast.

It was on July 6, 1891, that he left his home in Talladega for Savannah, Ga., and thence by boat for Boston. In Savannah, while waiting for the boat, he used his time in observing the various wonders of the wharves and the vessels anchored there.

During the voyage of the *City of Macon* DeForest kept a full account. It reads almost like a ship's log. Very little attention is given to passengers or other incidents. It consists almost wholly of details of the ship's action. In getting out of the harbor of the Savannah River, the vessel became grounded on a bar and it was necessary to call tugs to pull her off. The process is given in detail in DeForest's account.

On arriving at Boston, his first visit was to a book shop where he purchased a copy of the "Encyclopedia of Science," which he kept and studied in spare hours for a number of years.

From Boston he entered a boys' camp, where he spent the time intervening until the opening of Mt. Hermon. Here he showed a surprising ability at practical joking which was not particularly marked before. It followed him through his time at Mt. Hermon and cost him many a weary hour of extra duty and not a few fights.

His accounts of them are screamingly funny, not so much because of the stunts themselves, but the manner in which they are told. Set down in the most matter-of-fact way, without the slightest embellishment, it hardly seems possible they were practical jokes. One of them goes something on this order:

"Doused Bob and Joe on the floor below with two bags of water; found my bed torn up when I came home, as a result." All the accounts read similarly, clear, concise, no extra words. He seemed to perform them as though they were a quite regular part of the day's routine.

It was during his stay at this camp that he obtained his first view of the electric lighting system. One of the instructors took a class of boys into a nearby town and conducted a tour through the small generating system.

After the completion of six weeks in the camp he was matriculated in Mt. Hermon, September 2, 1891. The first two days of his stay were given over to examinations, all of which he passed with ease. He says of his first academic day: "Father goes home tomorrow. I had a hard day. Didn't get my books and so lessons will be unprepared. Studied from seven till nine. Then rest. . . ."

WORK HOUR

At Mt. Hermon, each student was required to do a certain amount of manual labor each day. There were assignments that had to be fulfilled even as Greek or Virgil. During his first term DeForest was assigned to farm work and spent two and a half hours a day for the first several days at school digging potatoes.

To those not acquainted with such a curriculum—consisting of Virgil, algebra, geometry and three other subjects, together with two and a half hours of work—such a daily routine seems almost horrible. Add to that training for track work and DeForest's routine results.

Nowhere is there recorded a complaint against the amount of work he was called upon to do. It seems he had become accustomed to a strenuous grind since his childhood so the work at the school was no harder than usual. To make it worse, on account of the diminutive size of his allowance, he was forced to spend many of his weekly holidays working for additional funds. He continued this practice almost constantly throughout his entire stay at Hermon.

It is notable that unless he was actually busy, mentally or physically, he classed the time as "fooled away." Such use of it was seldom made. Through early training or otherwise, he was unable to master the technique of graceful loafing sometimes called "contemplation." His mind demanded some occupation and demanded it in the form of an actual problem. This trait is one that followed him consistently, also.

This seems to have led to a strange deviation. It could be logically expected at his entrance into the life of the school, with the wealth of human contact which had been denied him before, and an untramelled outlet for his actual spirit and moods, that he would have shown some of the spirit of fun and care-free youth. Such was not the case. With a doggedness, which often became almost drudgery, he continued to mull and work, taking joy in nothing else. Though he was extremely fair with himself, he was almost constantly worried when some trick of chance would force him to let a lesson go unprepared. The ideas which motivated this application were a blind sense of duty to himself, an everburning ambition, a healthy egotism.

AT HERMON

He was not extremely efficient and decidedly was not a hale-fellow-well-met. When a room-mate or fellow student became restless or talked while he was studying, DeForest could not concentrate and would become slightly angry. He had few friends —really no close ones while he was in Mt. Hermon. There was no one whom he considered as a confidant or no particular chum with whom he shared his feelings. It was mostly work—little, if any, play.

Even in athletics, a chance game of tennis or checkers, he looked upon as work and felt hurt if he was beaten. In every note of every game—even an impromptu tennis game played by two couples on a holiday afternoon—he would record the score, and if beaten the reason for it.

In case of defeat, he never made an alibi. If he was beaten on account of training or lack of knowledge he said so. And upon stating the defect would follow it with a resolve to better himself.

He set a record in the one-mile walk during his first year's work, but did not thereafter touch the mark again. In fact, he was beaten when he attempted to uphold the honor of his school the following year.

The summer following his first year was occupied in selling books—the volume was one dealing with handicraft around the home. A fair amount of success crowned a hard, dirty summer's toil.

The last year followed pretty much the same course as the first. Among his studies were geology, chemistry (which he particularly liked), trigonometry, history, Bible and public speaking. Along with the activities of the school went a great amount of church work. Since the school was under the special protectorate of The Rev. Dwight L. Moody, it was no small wonder that the Christian character of the students was pretty thoroughly cared for. There were not more than half a dozen Sundays during the time DeForest was in school when he missed church services. Aside from the regular Sunday services, there was no end of prayer meetings which all students were expected to attend. Many times attendance at them caused him extra hours preparing work which should have been done during the time they consumed.

One of the most enjoyable courses the last year was a laboratory course in chemistry. For the whole semester DeForest kept well ahead of the class and did an amount of extra work.

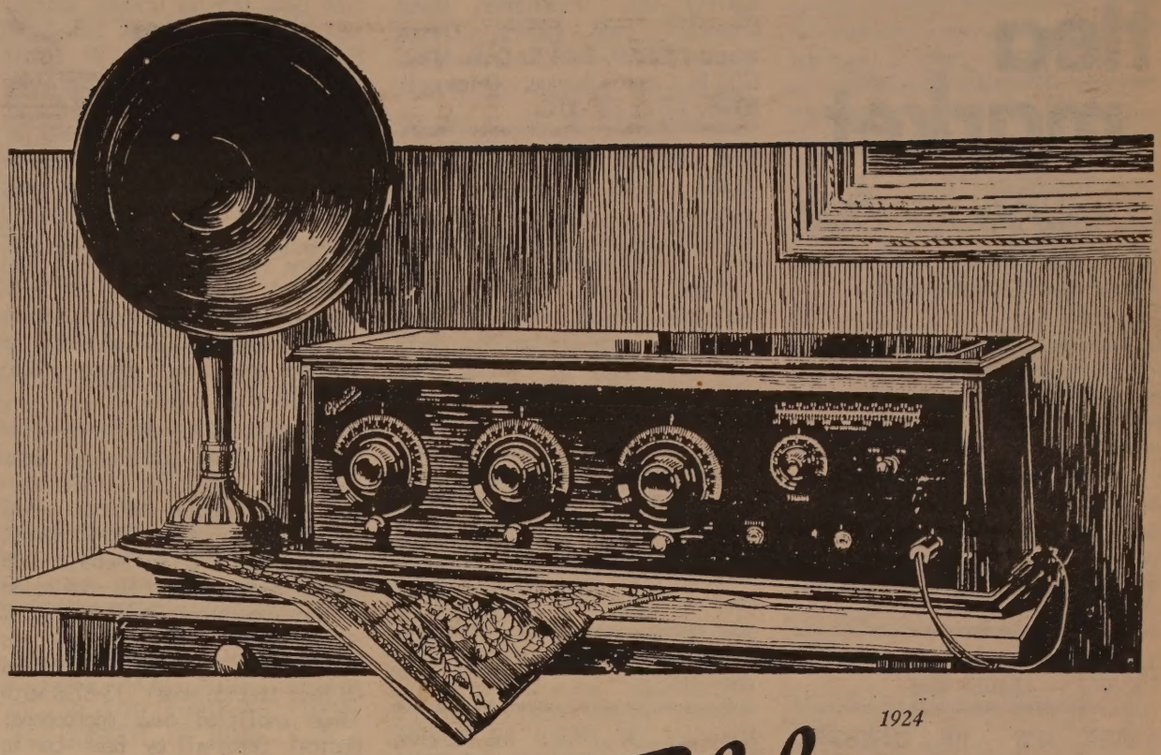
On account of an enmity which arose between him and one of the monitors, a great deal of bitterness crept into his last weeks at Mt. Hermon, since he was forced to observe work hour almost until graduation day. The remainder of the Seniors were excused.

Graduation, however, made up for a great many inconveniences and ills. He stood among the highest in his class, having made a long list of "E's" in chemistry, geology, algebra, geometry and the very highest grades in the physics class.

The prospect of entering Sheffield Scientific School at Yale in the immediate future where he could continue more actively his studies without the pettiness and bigotry entailed by the religious school, and his nomination by his class to present a scientific oration at the class day exercises tended to ameliorate, to a great extent, some of the ills which fastened themselves upon him during his latter months at Mt. Hermon.

Mt. Hermon closed a definite period in DeForest's life. It had its effect and the assistance and kindly understanding given him by his science teacher, a Professor Dickerson, remained always as an inspiring and pleasant memory.

(*To be continued*)



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TUBE CHECKER (OLD, NEW TUBES) POCKET SIZE, unused with instruction manual. quanity available $6.50; Old crystal radio. kits, Instructions, all parts included, rare, new supply available, $16.00 each; all above postpaid; large electronics, parts catalog $1.00; D. Testa, Box 9064-HS, Newark, NJ 07104.

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SALE: WD-11 ADAPTERS, ISOLATION transformers, test equipment, auto radios, new old stock vibrators, audio amplifiers, 5,000 new tubes, power transformers, books on radio subjects plus too many items to mention. Send SASE for quote on your needs. James Fred, R1, Box 41, Cutler, IN 46920. Phone (317) 268-2214.

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FOR SALE OR TRADE: THE GENERAL RADIO EXPERIMENTERS" CONTAINS INFORMATION ON EARLY GENERAL RADIO RADIO EQUIPMENT, ETC., INCLUDING PHOTOS. VOL. 1, (1926-27) VOL. 2, (1927-28) COMPLETE EACH SET $25; VOL. 3, (1928 1st 6 MO.) $15; AK SEPT. 1924 CATALOG, $15; AK INSTRUCTION BOOK, VOL. 4, 1927, $20; AK COLOR FLYER, APPROX. 14" X 10", ADVERTISING MODEL 42 AND E SPEAKERS. $10; RIDERS 1-5 ABRIDGED AND 6 THRU 14, $150; ALL MATERIAL ORIGINAL. RCA RADIOLA 26 WITH SEPARATE BATTERY BOX, WORKS, AK MODELS 21 AND 49, WORKS, ACME DOUBLE CONE SPEAKER, GOOD COILS, $35; RADIOLA 16 CABINET $5; RADIOLA 17 CABINET $10; RADIOLA GRAND CABINET AND SOME PARTS, $100; SHIPPING EXTRA. RAYMOND THOMPSON, 7422 CHERRY TREE DRIVE, FULTON, MD 20759.

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THE VINTAGE RADIO FOUNDATION - - - are you a member? - if not, get full information from Jim Lanphear, 4062 Oak Point Ct., Hayward, CA — 94542.

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FOR SALE: RADIO RELATED TIE CLASPS & lapel pins, send a L.S.A.S.E., I also buy old wooden clocks; Michael S. Sabodish, Sr., 11 - A Matawan Avenue, Cliffwood, NJ 07721.

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NATIONAL HRO. Older pin-type tubes. Rack mount. With six coil sets (not continuous). Fair shape. $95; RME 69, rack mount (no cabinet) fair/good $95; Two meter composite AM transceiver. Works! $15; One WE 101D tube. Good filament. $20.- Paul C. Crum, W9LC, 6272 N. Cicero Avenue, Chicago, IL 60646. (312) 282-3033.

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FOR SALE: QST, 1917-1930; MAGNAVOX AC 3C AMP, $250; GENERAL ELECTRIC E-61 ROUNDTOP, $150; JACKSON 660 SIGNAL ANALYSER, $15; A-TRONIX CODE READER, $25; REPRO DeFOREST O-90 CURVED SCALE PLATES, $5; WD-11, NIB, $40; THORDARSON SPARK TRANSFORMER, $150; VT-1 or VT-2, $25 EACH; RADIOLA AR1300 and AA1400, PREDECESOR TO RADIOLA V, $300; 23 TUBE SCOTT CONSOLE, $600; WESTERN ELECTRIC 24A, 25A and 30A RELAYS, $20 EACH. SASE FOR LIST. JIM COLLINGS, 12005 VICTORIA PL., OKLAHOMA CITY, OK 73120. (405) 755-4139.

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FOR SALE: AIRLINE MIDGET BAKELITE, model 7???, very good, $25. Philco 49-603, very good, opens like a book, $25. Heathkit Mohican, mint, $75. Admiral Bakelite, 45-J15, BC/SW, very good, $25. JUNKERS: RCA Victor 45X1, good cabinet, FOS page 155. Crosley 56-PB, AC/Batt. Philco Transitone 52-540. All $5. Add shipping. WANTED: Mint condition 24 hour clock for Hammarlund HQ-100A with installation instructions. J. S. Lowe, 3025 Harpers Ferry Road, Sharpsburg, MD 21782.

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FOR SALE: RCA VICTOR portable AM radio #BP-10. 4 tube superhet, unusual about 1/4 the size of a shoe box, it is oblong, handle on side, lid opens, chrome grill frontpiece! Nice! Best offer. Like new. TUBE CHECKER (old new tubes), pocket size, unused with instruction manual. quanity available. $6.50 each. P.Pd.; — Military technical manuals, complete service with schematics for receivers. R-392/URR, R-390A/URR $15 each P.Pd.; — Other T/M's available, low cost, send wants; — Dynamotor DM-34 #5; — Old crystal radio kits. Instructions, parts included. (quanity available) $11. each P.Pd. (10 for $90). D. Testa, P. O. Box 9064-HS, Newark, NJ 07104.

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HEATHKIT HW-100, SHIP COD. M. G. Clute, K5DXV, Route 1 Box 1, Jewett, TX 75846.

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RME 69 EARLY RECEIVER. rack mount, generally good, weak on 160 meter band $95; loose coupler, unusual replica $35; crystal grinding outfit $15; very early RCA/GE/Acme transmitter power supply transformer and choke (for Vu-202 & such) iron case $45; Polaroids $1.00@. All plus UPS. Paul C. Crum, W9LC, 6272 N. Cicero Avenue, Chicago, IL 60646. (312) 282-3033.

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FREE: Send 2-stamp LSASE for just released Flyer, No. 189A to: Olde Tyme Radio Company, 2445 Lyttonsville Road, Suite 317, Silver Spring, MD 20910.

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FOR SALE: to receive America's best list of radios, tvs, mags, etc.. send $1.50 for current list to: Jim Clark Enterprises, Dept.,HS, 1292 Starboard, Okemos, MI 48864.

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SEND LARGE SASE for list of radios., Donald Juleen, 6252 Ledge Road, Sturgeon Bay, WI 54235.

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FOR SALE: FREED EISEMANN, model NR-7, front of cabinet is good, cabinet could use varnish, with tubes, in working condition with home made power supply and original instruction book, very clean inside, No. 960BB. RCA model no. 75X17, serial no. B002243, rare Japanese art work on cabinet, works, very clean with tube layout, etc., on back of set, $175. Bill Wood, 714 W. Main Street, Memphis, TX 79245. (806) 259-2918.

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FOR SALE — RADIOLA

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VICTOR (ALHAMBRA) lowboy, Orthophonic Victrola in right side, working excellent, Radiola 20 battery radio in left side, tubes and speaker have continuity, did not apply power to battery radio, physical appearance is excellent. ASking $300 pluys shipping costs. Phil Guinan, 106 Page Road, RFD 7, Litchfield, NH 03051. (603) 889-6213.

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FOR SALE — RECORD AUCTION

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I am planning to issue a ten inch Black labeled Victor record auction closing in December. Teh records will range in age from 1905 through 1955 approximately. Anyone wanting a copy of this list please send me your name and address on a postcard and ask for list BL2. Anton Johannes, R. D. #3, Box 253, Pine Bush, NY 12566.

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PHILCO 95TH ANNIVERSARY limited edition cathedral radio, AM/FM transistor chassis, look a like to Philco model 90 - 1932- collector's item, only $59.95 plus $5.00 shipping. Maurer TV, 29 South 4th Street, Lebanon, PA 17042.

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FOR SALE: COMPLETE SET OF POPULAR ELECTRONICS MAGAZINES 1955-79. QST 1950-60 IN BINDERS (EXCEPT 55, 59). MIKE GRIMES, K5MLG, 3805 APPOMATTOX, PLANO, TX 75023

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SCHEMATIC $1.25 each, give make and model number. New manuals of old tubes, substitution guide, characteristic, VT numbers and pin out guide, Tubes, books, and parts. Send SASE to Housel, 1816 S.W. 12, lincoln, NE 68522.

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BACK ISSUES OF THE HORN SPEAKER - COMPLETE - FROM 1972 - 1989 IN FINE CONDITION. $50.00 POSTPAID TEL. # 273-5282. HERB F. DeGARMO, 203 3RD ST., EARLY, IA 50535.

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FOR SALE OR TRADE= 1938 NATIONAL RADIO INSTITUTE RADIO COURSE: APPROXIMATELY 80 BOOKLETS IN TWO NRI BINDERS. 1938 NRI TEST ANSWERS IN NRI GREEN BINDER. 1938 RADIOTRICIANS SERVICE MANUAL IN BLACK BINDER. 1952 NRI RADIO COURSE IN NRI BINDER. ALL IN GOOD CONDITION. WISH TO TRADE AS PART PAYMENT ON ANY MANUFACTURED CRYSTAL RADIO, OR PARTS TO CRYSTAL RADIOS OR TWO CALIBRATED KNOBS 2 1/2" DIAMETER OR PHILCO ONE OR TWO TUBE 1938 SLANT FRONT KIT RADIO OR ANY SIMILAR ITEMS. RICHARD R. SPRATLEY, 2112 McLAIN STREET, CHESAPEAKE, VA 23324. PHONE (804) 545-2402.

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THIS SERVICE MANUAL supplement contains a list of electrical values, resistors and condenser, coils and transformers in all Atwater Kent radios 1924-1933 inclusive $3.50 P.P. 24 pages. ****** THIS BULLETIN contains the complete list of Philco black bakelite "by pass" condensers, new universal types, discontinued types with replacements and condensers with internal resistors $1.50 P.P. —— Lee Williams, 2015B 228TH S.E. Bothell, WA 98021.

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FOR SALE— RIDERS MANUALS, ABRIDGED (VOL. 1-5) AND VOL. 6 THROUGH 16 $275.00. VOL. 9, 10, 14 $20.00 EACH. ANTIQUE RADIO SERVICE, O. H. McDONALD, 2535 WEDGLEA #124, DALLAS, TX 75211.

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FOR SALE OR TRADE— POPULAR ELECTRONICS magazines 1956-79; QST 1950-60 in binders (except 55-59). Will break sets by year. Mike Grimes, K5MLG, 3805 Appomattox, Plano, TX 75023.

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ELECTRONIC ORGAN SCHEMATICS AND MANUALS. SASE FOR PRICE QUOTES. MANY MAKES AND MODELS. ALTON H. BOWMAN, 4172 EAST AVENUE, RD 2, CANANDAIGUA, NY 14424.

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FREE INFORMATION ON ANTIQUE RADIOS, Robert Johnson, 1895 Curtner, Apt. #2, San Jose, CA 95124.

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FOR SALE — SONY

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SONY ICF PRO 80 LW MW SW VHF UHF finest quality hand held radio/ Received as a gift. Used only once. All packing material. Cost $500. Sacrifice $290. S. Leonard, Box 127, Albertson, LI, NY 11507. (516) 742-0979

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THORDARSON FLYBACK YOKES $15. POSTPAID 2 - 167, Don Aldred, 39 East 8th Street, Jacksonville, FL 32206.

1**********

FOR SALE: UV201A's, good emission, brass base, no tip, (have 60) $15.00 each; Riders 1-5 abridged, 6 thru 14, $150.00; AK models 20c, 21, 30, 32, 35, 49; Acme double cone speaker $35.00; Radiola 17 cabinet $10.00; Radiola IIIa cabinet $15.00; Radiola 16 cabinet $5.00; Shipping extra. Will trade for AK, RCA or DeForest items. —— Raymond Thompson, 7422 Cherry Tree Drive, Fulton, MD 20759.

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30 DAY SALE: New tubes in original cartons $2.00 each. OZ4, 1AD2, 1BC2, 1R5, 2AV2, 3HQ5, 3Q4, 3S4, 4BZ6, 4BZ7, 5AM8, 5U8, 6AH4, 6AL5, 6AM4, 6AM8, 6AQ6, 6AS8, 6AW8, 6AY3, 6BC7, 6BF6, 6BJ8, 6BK5, 6BW8, 6CM7, 6CN7, 6CS7, 6CU5, 6CU8, 6CY7, 6DB5, 6DK6, 6EM5, 6FS5, 6GC5, 6HZ6, 6KZ8, 6U8, 6W6, 7AD7, 8AW8, 8CX8, 10EG7, 12A4, 12AB5, 12AL5, 12AT6, 12AT7, 12AV5, 12AV6, 12AZ7, 12C5/12CU5, 12D4, 12DB5, 12DT5, 12KS, 13DE7, 14E6, 14E7, 19AU4, 19J6, 35B5, 35W4, 35Z3, 50EH5, 5963, 5964. Add $2.40 shipping (Wisconsinites add 5%) Don Diers, 4276-S4 North 50th Street, Milwaukee, WI 53216-1313. Send $1.00 (refundable) for lists of tubes and stuff.

****

FOR SALE: GRILL CLOTH. New, custom-made material in diamond pattern. Good match for 1930's radios. $6.00 for 10" X 12" piece, postpaid. Send SASE for sample. Michael Katz, 200 East 30th Street, Apt. 8E, New york, NY 10016. (212) 725-0736.

****

TUBES ONE-V 6.00, 6V5/6G5-6E5 12.00,6L6M 17.00, 6L6 GC 10.00, 6 and 12 V 3 and 4 prong vibrators 12.50 all ppd. H. f. Brammell, 204 E. Maple, Americus, KS 66835.

An opportunity is now to own a unique electronic invention of the century. SASE and $1.00 for photo. Bill Russell, 3236 Laurel Canyon, Santa Barbara, CA 93105. (805) 682-8115. Accepting offers through March 1988 (min. bid $2,500 or $3,500 sold outright.)

****

FOR SALE. — PARTS, TUBES, MISC RADIO ITEMS, SURPLUS, HAVE LIST. NO SASE REQUIRED, MUST DISPOSE OF. REASONABLE GIVE AWAY PRICES. K4UJZ, R. OLMSTED, 608 W. THOMPSON LANE, MURFREESBORO, TN 37129.

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FOR SALE — ZENITH

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I HAVE A CHASSIS for a Zenith 5801 console with 8 1/2" black dial, with tubes. $20.00 and UPS. H. F. Brammell, Box 319, Americus, KS 66835.

****

THE CABINET IS IN MINT CONDITION and the radio plays. It is a Zenith 12 tube superhetrodyne with a tuning range 540-18400 kyc., chassis 1204-A. Marshall T. Bond, 8718 Linkfair lane, Houston, TX 77025. (713) 668-0029.

****

FOR SALE: 1940'S VINTAGE ZENITH CONSOLE radio and phonograph. Cabinet is in excellent condition. $250.00 — Call (815) 838-5398. 5 p.m. to 10 p.m. c.s.t. Dick Stauss, Rt. 1 Box 399, Lockport, IL 60441.

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TRADE — ATWATER KENT

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TRADE: I HAVE A NICE A-K 10 "breadboard" with M horn speaker for trade for a Collins bakelite panel amateur transmitter. Also need schematic for a Collins 32G transmitter. Parker, W1YG, 87 Cove Road, Lyme, CT 06371.

****

WANTED — ATWATER KENT

FOR MODEL 812 receiver, original factory service data, any other information, power transformer, Tune-A-Lite lamp. B. T. Wooters, W5KSO, 8303 E. Mansfield Avenue, Denver, CO 80237. (303) 770-5314.

WANTED: ATWATER KENT CATHEDRALS, ESPECIALLY MODELS 90, 92, 228, 246, AND 567. JIM COLLINGS, 12005 VICTORIA PL., OKLAHOMA CITY, OK 73120.

WANTED — BRUNSWICK

ONE PUSH BUTTON for a Brunswick radio. Chassis M-27-6 serial # 1237. It is brown bakelite, 7/16" in. diameter, 1" long. George C. Edwards, Route 3, Box 956, Henderson, NC 27536.

WANTED — CRYSTAL SETS

BUYING HOME MADE OR MFG. CRYSTAL SETS OR ITEMS. Tom Hartley, P. O. Box 29284, Parma, OH 44129

HOMEBREW CRYSTAL SET. Dial type mounted on nice wooden cabinet. Vernon Kostohryz, 600 Lakeside 3A, Brownsville, TX 78520. (512) 541-5692.

WANTED — GENERAL RADIO

ALWAYS INTERESTED in older General Radio test equipment and components. Frederick G. Suffield, 817 West Fir, SEQUIM, WA 98382. (206) 683-6482.

WANTED — GENERAL

COLLINS PRE 1942 TRANSMITTER. COLLINS 32V WORKING OR PARTS, COLLINS KW TRANSMITTER WITH COLLINS PTO EXCITER. R. OLMSTED, 608 W. THOMPSON LN., MURFREESBORO, TN 37129. (615) 893-5344.

FEDERAL JR. XTAL SET, good condition; medical quack machines, shocking belts, etc.; RCA items - Concert, ER 753, Radiola 24, RS; David Moore, 3213 Regal Oaks, Pearland, TX 77581. (713) 485-1705.

EARLY TUBE TYPE CB's AND transistorized Walkie-Talkies in good working condition. Gary Cappoen, 18025 NE Chehalem Drive, Newberg, OR 97132.

DIAL AND DIAL DRIVE FOR A PHILCO 16 CODE 121 OR JUNKER CHASSIS FOR SAME; UTAH DRIVER FOR THE BUILT-IN HORN ON A FRESHMAN MASTERPIECE. THOMAS BISEL, 2266 HALYARD COURT, SAINT LOUIS, MO 63129.

GENERAL RADIO DIAL KNOBS WITH METAL SKIRTS, WESTON SURFACE MOUNT METERS, AND ANY PRE-WWII AMATEUR RADIO EQUIPMENT. PARKER, 87 COVE ROAD, LYME, CT 06371. TEL. (203) 434-7783.

ORIGINAL BOXES that the following radios were packaged in when new: Motorola 65L11 anbd 65L12 (1942-1946), RCA "Globe Trotter" 66BX and 8bX6 (1946-1948) and Mitchell "Lullaby bed lamp radio" 1250 and 1251 (1948). Write to: Mike Hanke, 1036 South 15th Avenue, Wausau, WI 54401.

TEN TEC TRANSCEIVERS: ARGONAUT. POWER MITE. SWR.ANT. TUNER. TEN TEC SIGNALIZER. QRP MODULES, VO1, MX-1, AA-1, TX1, R. OLMSTED, K4UJZ, 608 W. THOMPSON LN., MURFREESBORO, TN 37129. (615) 893-5344.

L'TATRO, WILCOX-GAY, KINGSTON, MIDLAND (Decorah, IA made), KAROLA, PHILLIPS (made in Kokomo, IN) and other lesser known brands. James A. Fred. R 1, Box 41, Cutler, IN 46920.

RIDER'S TROUBLESHOOTER'S manual Vol. I, 1929; AK model R horn; RCA Radiolas VII; VIIB; special; parts for Zaney Gill cathedral; parts for Sparton model 15; Raymond Thompson, 7422 Cherry Tree Drive, Fulton, MD 20759.

WANTED- HALLICRAFTER TRANSMITTER HT-6, HOWARD RECEIVER 430. STANCOR, THORDARSON TRANSMITTERS. POWER SUPPLIES. PARTS FROM ABOVE TO BUILD OR RESTORE. K4UJZ, 608 W. THOMPSON LANE, MURFREESBORO, TN 37129.

WANT TO BUY HEADBOARD RADIO, 1949 - 1950. Will pay $20.00. John Smith, 3824 Dutch Village Road, Apt. 52, Halifax, NS Canada B3L 4G2.

WANTED: 2 - 216A VACUUM TUBES, Continuity check on filament NG. Check with 6 volts 1.3 amps. for filament glow. WANTED: Gillfillan or Garod Neutrodyne receiver. Uses UV199's has meter on panel for A and B voltage. T. Drogoski, 507 Coal Valley Road, Jefferson Boro, PA 15025.

WANTED: CHASSIS FOR CROSLEY Buddy Boy model 58 and speaker, chassis and power supply for AK model 53, part for AK "breadboard" where 3 tubes sit on. Jerome Schliepp, 831 Berlin Road, Ripon, WI 54971. (414) 748-2471.

WANTED: RIDERS 1929 SERVICE MANUAL, VOL. 1; PARTS FOR SPARTON MODEL 15; AK MODEL R HORN; RCA MODEL VII, VIIB; PARTS FOR ZANEY GILL; RAYMOND THOMPSON, 7422 CHERRY TREE DRIVE, FULTON, MD 20759.

WANTED: EARLY CANADIAN RADIO MAGAZINES SUCH AS CANADIAN WIRELESS, RADIO INFORMER AND "RADIO". QST FOR 1918-19 ALL WAVE RADIO, SHORT WAVE CRAFT 1931, RADIO DESIGN AND RADIO BROADCAST 1928. RCA VICTOR R35 WITH CABINET. AUDIO TRANSFORMER FOR RCA R15 OR RCA RADIOLA 48. RADIOLA 20 WITH GOOD AUDIOS. SCREEN GRID TYPE BROWNING DRAKE OR FACTORY BUILT SINGLE CONTROL MODEL. SPARTON TRF MODEL 5-15 1925. COMPLETE CHASSIS WITH DIAL OR JUST GOOD DIAL SCALE FOR RCA 15 OR RCA RADIOLA 48. JONES 7 PIN PLUG WITH OR WITHOUT CABLE. CRYSTAL DETECTOR FOR RADIOLA V AND SE1420. RADIOLA 20 CHASSIS AND RADIOLA 16 CHASSIS BOTH WITH VERY GOOD AUDIO TRANSFORMERS. RON A. MCNEILL. P. O. BOX 472, Yorkton, SASK CANADA, S3N 2W4.

WANTED WANTED 50A1 TUBE. 6CD7 EYE TUBE. OWNERS AND SET UP FOR THE FOLLOWING. TUBE TESTERS WESTON 682. 676. JEWELL 538. PHILCO 050. MOSS 247. B&K CATHODE TUBE REJUVENATOR MODEL 200. RCA 115-A COLOR PIX TUBE TESTER. RCA WV 87-B VTVM. HICKOK 203 VTVM. HICKOK 260 TV PATTERN GENERATOR. SX42 HALLICRAFTER SW REC. XEROX COPIES FOR THE ABOVE OK. KRANTZ, 100 OSAGE AVENUE, SOMERDALE, NJ 08083.

WANTED— GREBE CR18 - CR3A. PLUG IN COIL GREBE. R. OLMSTED, 608 W. THOMPSON LANE, MURFREESBORO, TN 37129. (615) 893-5344.

BUYING SCOTT AND McMURDO SILVER. WILL MATCH OR TOP ANY OFFER. JAMES E. BRAGG, 30881 ALISO CANYON ROAD, ACTON, CA 93550. (805) 269-0528.

DIAMOND "T" RADIO, dead horns, speakers, fixer upper sets, 32 volt items, parts for Bremer Tully Counterphase, Thorola, Stewart Warner 300, will swap repairs or ? — Jim Barratt, 26313 SE Leonard Road, Camas, WA 98607.

HOLTON ALTO SAX made in the 1920's. Must have at least a 5" diameter bell and have a 5 digit serial number starting with number one or two! Send photo and complete description to: Saxophone, P. O. Box 773, Wausau, WI 54402.

FRONT DOOR of AK Kiel table. Also want 16mm sound print of 3 stooges, "A Plumbing We Will Go." Jim Baker, 704 Medway Road, Hagerstown, MD 21740-4130.

WANTED — HALLICRAFTERS

HALLICRAFTERS SHORT model SX42. Call (312) 961-7737. Rich.

FOR SX-15 SKY CHALLENGER — original owner/ operator manual, any service information. B. T. Wooters, W5KSO, 8303 E. Mansfield Avenue, Denver, CO 80237. (303) 770-5314.

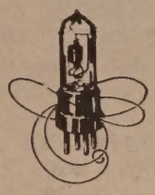
Out of 185 mailings of THE HORN SPEAKER, May 1989 was really slow. We plan to catch up this summer.

The
VINTAGE RADIO FOUNDATION

are you a member?..

You should be.
Write for Info.

Jim Lanphear
4062 Oak Point Ct.
Hayward - California
94542



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The number of super-het circuits offered the home-constructor in the late Twenties was awesome, and there has never been offered the hobby a sole-source of relevant data. Now, in response to a long series of requests D.H.MOORE has created another important contribution to the hobby - "Super-Hets of the Twenties". As with his other vintage radio writings, this massive Monograph combines scarce technical information and broad human interest. Among its contents are:

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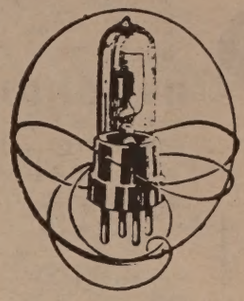

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A rather large (200 pages) and lavishly illustrated Monograph is now ready for your further enjoyment of the hobby. A copy may be ordered from either of the addresses listed below, whichever is most convenient for you. The price is $25,ppd.

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WANTED — LEUTZ

WANTED FOR LEUTZ MODEL "C" super-het.: 2 Weston No. 301 voltmeter 0 - 10 volts DC. 2 Weston no. 301 ammeter 0-5 amps. DC. 4 General Radio type 231 A audio transformer. 6 special Leutz I.F. transformers. 1 special E.I.S. (Leutz) oscillator coil. 1 special E.I.S. (Leutz) R.F. coupler coil. John A. Rawlins, Jr., 1920 Stephenson Drive, Mesquite, TX 75149. (214) 285-2313.

WANTED — LITERATURE

KNIGHT RADIO 6 VOLT storage battery operated. Patented numbers are by the Hazeltine Corp., model 88BE1649, in pencil this number 88BE121K, has phono input plug, tubes are; 6N5 tuning eye, 19, 6D8, three 6S7, two 6L5 — Philip O'Donell, P. O. Box 944, Alleghany, CA 95910 — Tried two other magazines with no success. Hope I get results.

ORIGINAL LITERATURE showing complete line of 1973, 1974 and 1975 Motorola AM and AM/FM portable radios. ~~Also original owner's manual for 1940's Motorola portable radios.~~ Also original owner's manual for 1940's Motorola portable AM (model 65L11 or 65L12) Mike Hanke, 1036 S. 15th Avenue, Wausau, WI 54401.

SERVICE MANUAL FOR NATIONAL NC-7" TV RECEIVERS. FRED EMERSON, 627 ILLINOIS AVENUE, ELGIN, IL 60120.

SCHEMATIC FISHER AMP. STEREO MODEL400 SERIAL 34732 S. ALL TUBE AND HAS FOUR 7868 IN OUTPUT. J. MC DADE, 204 E. JOPPA ROAD, # 214, TOWSON, MD 21204.

SAM'S FOLDERS No's. - 55-5, 60-1, 61-16, 80-4, 81-3, 82-1 and 104-2, FRED EMERSON, 627 ILLINOIS AVENUE, ELGIN, IL 60120

INSTRUCTION MANUAL FOR EICO MODEL 950 A RC BRIDGE CONDENSER CHECKER. H. F. BRAMMELL, 24 E. MAPLE, AMERICUS, KS 66835.

EVERY DAY MECHANICS, VOL. I, NO. 4, MAY 1916 OR A COPY OF "HOW TO BUILD A TRANS- ATLANTIC WIRELESS RECEIVING SET. K. A. LADD, 5240 44TH AVE. S., MPLS., MN 55417. (612) 722-6786.

LAFAYETTE RADIO CATALOGS - 1960 THRU 1968, PLEASE STATE CONDITION AND PRICE. MR. MICHAEL S. SABODISH, SR., 11 - A MATAWAN AVENUE, CLIFFWOOD, NEW JERSEY 07721.

WANTED: OPERATING MANUAL and tube data sheets for Jackson Dynamic tube tester model 636. Zerox copy O.K. Frank Hoffert, 19605 Chardon Road, Cleveland, OH 44117.

WANTED - INFORMATION AND SCHEMATIC for Blaupunkt Sultan 3D radio. Model number unknown, 5 tube AM/FM/ SW. Write Ray Carifio, N4LTS,

J-5A
LIMITED QUAN.

$24
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50 YEAR OLD FLAME PROOF KEY
TYPE J-7-A
Gov't. Order No. 141082 Dated: 1921

FOR SOME 50 YEARS, THE J-7A KEYS WERE STORED IN A REMOTE WAREHOUSE IN THE HUGE BROOKLYN NAVY YARD. IN 1966, THE NAVY CLOSED THE YARD AND THE CITY OF NEW YORK PURCHASED THE PROPERTY. THE KEYS WERE DISCOVERED AT THAT TIME.

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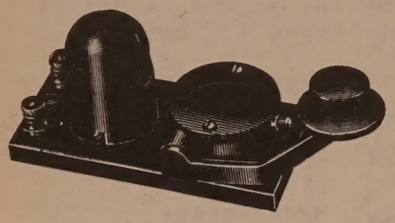
THE BRANCH COMPANY, NOW CLOSED, MANUFACTURED A LARGE VARIETY OF KEYS ALONG THE STYLE OF THE J-7A FOR THE U.S. GOVERNMENT. THE J-5-A, MADE FOR THE SIGNAL CORPS, IN 1941, IS THE SAME TYPE EXCEPT FOR THE BULB PART.



RECONDITIONED
CLEANED &
KEYING ARM
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$45 PPD

J-7A

J-7A $29
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THE KEYS ARE OF HEAVY DUTY CONSTRUCTION WITH A LARGE NAVY TYPE KNOB AND BRASS KEYING ARM. THE BAKELITE BASE IS 3/8" THICK WITH A SIZE OF 2-5/8" X 5-1/2". THE BULB, OR LAMP IS NOT SUPPLIED WITH THE KEY.

W L JACKSON
909 NE 11TH ST
GRAND PRAIRIE, TX
75050
214-262-7855

6014 SW 33rd Street, Miami, FL 33155

WANTED: LIBRARY BOUND volumes of QST, CQ, 73 PRE 1960. ALSO GLOBE SCOUT (WRL), MIKE GRIMES, K5MLG, 3805 APPOMATTOX CIRCLE, PLANO, TX 75023.

WANTED: SCHEMATIC AND INFO on Eico ST 70 amplifier. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada T6H 0H9.

WANTED: INSTRUCTIONS FOR PACO MODEL 25 IN-CIRCUIT CAPACITOR TESTER RCA WR-50A SIGNAL GENERATOR CRYSTALINER (CRYSTAL MODULES) GENERATOR, GLENN HARTMAN, 5545 DEEP HOLLOW, FAYETTEVILLE, NC 28311.

WANTED — NATIONAL

FOR NATIONAL HRO-50T receiver, original owner/ operator manual, CXO 100/1000 kc. xtal. calib., NBFM-50 adapter, SOJ-3 adapter, coil sets G, H, J, AB, AC. B. T. Wooters, W5KSO, 8303 E. Mansfield Avenue, Denver, CO 80237. (303) 770-5314.

WANTED DEAD OR ALIVE FOR RESTORATION OF NATIONAL HRO COMMUNICATIONS RADIO. OLDER MODEL PREFERRED USING EITHER 57/58 OR 6C6/6D6 TUBES. WILL PAY GOOD PRICE FOR COMPLETE UNITS WITH POWER SUPPLY AND COILS. DAVE MEDLEY, KI6QE, 1450 BAYVIEW HEIGHTS DRIVE, LOS OSOS, CA 93402.

WANTED — PARTS, TUBES, ETC.

NEED SET-UP CHART FOR OLDER 4-5-6 PRONG TUBES FOR PRECISION SERIES 10-12 TUBE TESTER. DAN MAURER, 29 SO. 4TH STREET, LEBANON, PA 17042

NEEDED: tube testing valves for Sonora RA-1, DE-1, RE-2, SO-1, SO-2. audio transformer for Eveready model 1, 2, or 3, or Bosch #28. Power transformer for Sonora model 30, 32 or 40. John Swett, 8116 Olmway, Olmsted Falls, OH 44138 (216) 235-1463.

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2 DUD XFMR's for model 52 Crosley, 1 dud xfmr for Radiola III, dial scale for model 40-185 Philco, 1 rheostat knob for Paragon type DA-2, 1 type F AK variable condenser. Will buy or trade, State needs. Joe H. Vittitow, 1341 Harrodsburg Road, Lawrenceburg, KY 40342. (502) 839-5444.

CHANNEL SELECTOR KNOB. CHANNEL INDICATOR BEZEL FOR PHILCO PREDICTA. — Joe Cunningham, 917 Lunt Avenue, Schaumburg, IL 60193.

CHROME TUBE CAP FOR NEUTROWOUND BATTERY RADIO. RUSSELL SCHOEN, E. 7340 NIETZKE ROAD, CLINTONVILLE, WI 54929. (715) 823-6744.

NATIONAL TYPE PSK PRESELECTOR FOR NATIONAL FB7-A RCVR. SW3, FB7 COILS. NATIONAL VELVET-B POWER SUPPLY. PAT STEWART, W7GVC, 1404 RUTH AVENUE, WALLA WALLA, WA 99362.

TUBE SOCKETS— 3-4-5-6 PRONG COMPOSITE. 2-5-6-7 PRONG COMPOSITE. 1-5-7 PRONG COMPOSITE. 4-7-7 PRONG COMPOSITE. JACK S. WALLACE, 5516 GILBOW AVENUE, RIVER OAKS, TX 76114. (817) 732-5189.

COOPER-HEWITT MERCURY vapor bulb. TCBA, RR6, Box 181, Glens Falls, NY 12801

FIXED DETECTOR GRID RESISTANCE FOR ATWATER KENT MODEL 32 AK PART # 8190, ALSO GRID LEAK RESISTOR, AK PART #8190. ALSO FOUND IN MODELS 20c- 30- 33- 35. C. Hoffman, 824 Gordon Street, Allentown, PA 18102. Phone (215) 434-2536.

REPLACEMENT CONE MATERIAL FOR STROMBERG- CARLSON 601-TRF COMPANION CONE SPEAKER. LAWRENCE DE ROSE, 12 WILLS AVENUE, R.D.#1, STANHOPE, NJ 07874.

MACHINES SCREWS TO HOLD PANEL TO CABINET, RADIOLA III AND IIIA, I NEED TWO DOZEN. ERNEST HECKLER, 1314 N. SPARKMAN, HARTSELLE, AL 35640.

WANTED — BATTERY RADIO CHASSIS AND/OR ANY INFORMATION ON BRUNSWICK RADIOLA PHONOGRAPH, MODEL BR100, PATENT 1923 — DICK ROZNOVSKY, BOX 480, RICHFIELD, OH 44286.

WANTED: CABINET & AUDIO TRANSFORMERS FOR GREBE CR9, ARTHUR HARRISON, 501 ARBOR DRIVE, COLUMBIA, MO 65201. (314) 474-8729.

DIAL TUNING KNOB AND RESET LOCK SCREW FOR A WARDS 62501 TABLE MODEL RADIO, RIDER 10 - 22, H. F. BRAMMELL, 24 E. MAPLE, AMERICUS, KS 66835.

ZENITH DETECTOR COIL NO. S-8436 USED IN CH, 10A1, 10A2, 10B1, 10B2. ATWATER KENT MODEL 60 A.F. TRANSFORMER ASSEMBLY. L49B BALLAST TUBE. 45 RPM SPINDLE FOR B5R C129 CHANGER EV/GAME 436. CABINET FOR PILOT TV 37. 3KP4 CRT. ELECTRONICS MEASUREMENT CORPORATION. MODEL 502 SIGNAL GENERATOR, ASSEMBLY MANUAL OR SCHEMATIC. AUDIO INPUT XFMRS FOR SINGLE PLATE TO P-P GRIDS. ANY JUNKBOX PARTS, LITERATURE. ANY EARLY TWO AND THREE PIECE CAR RADIOS, UNITED MOTORS, B.O.P., ETC. ANY OTHER FACTORY CAR RADIOS FROM 30'S - 40'S. ANY SIGNAL SEEKING TYPE CAR RADIOS, MUST HAVE KNOBS. CAR RADIO KNOBS. — ALVIN HECKARD, RD1, BOX 83, LEWISTOWN, PA 17044.

EARLY OR UNUSUAL TUBES, tube cans, cartons also early light bulbs pre 1900. Please describe with prices wanted to: Bruce Harbeck, 13408 Westwood Lane, Omaha, NE 68144. (402) 333-9013.

HALLDORSON 3 to 1 audio transformer, copper casing. hard rubber panel 10 x 11 x 1/4. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada, T6H 0H9.

DETECTOR and AUDIO PORTION of GREBE CR2. Also need cabinet for same. NEED FRONT PANEL FOR SCOTT Phantom DELUXE. Larry Steeno, 2728 42nd Street, Two Rivers, WI 54221. (414) 794-7320.

MARCONIPHONE VIII cabinet, also

Marconiphone VI chassis, or complete radios cash, or generous trade. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada, T6H 0H9.

WANTED— CABINET AND PARTS FOR A FEDERAL 61. Mike Kibler, 300 Speiter #39, Danville, IL 61832. (217) 267-3703.

WESTERN ELECTRIC TYPE 216A vacuum tube and VT25 or 25A tubes. The 216A must be check in a circuit. Tod Drogoski, 507 Coal Valley Road, Clairton, PA 15025.

TUBES: EARLY UV-217, type CA pliotron, DeForest DV-1 and DV-6, adapter for DeForest type T audion to fit candelbra socket. Parts: rheostat assembly and knob for Tuska 224 rcvr.; case w/hardware for Radiola balanced amplifier. B. T. Wooters, W5KSO, 8303 E. Mansfield Avenue, Denver, CO 80237, (303) 770-5314.

WANTED — PHILCO

WANTED: EMPTY CABINET for a Philco model 20 cathedral radio. I already have the radio and speaker. Must be in good condition. Joe Beach, 6515 Sunset, Garden City, MI 48135.

PHILCO MODEL 90B, working or not. Original speaker from Philco model 20— must be in good shape. Thomas Abell, 1022 S. Edison Ave., South Bend, IN 46619. Phone (219) 234-8405.

WANTED — PLASTICS

WANTED: CATALIN RADIOS. All makes: FADA, OSWALD, EMERSON, MOTOROLA, etc. Top prices paid. R. Wayne Oliver, 355 Highwood Avenue, Leonia, NJ 07605. (201) 944-0777.

WANTED — RADIOLA

LOOP AERIAL FOR PORTABLE RADIOLA MODEL 24 - PAGE 112 OF VINTAGE RADIO. Albert Warren, Box 279, Church Street, Waverly, PA 18471. Phone (717) 587-2405.

WANTED — SCOTT

WANTED: EH SCOTT, SCOTT transformer or World's Record radios, sometimes copper or chrome plated. Especially looking for Symphony, AC9, Shield Grid 10B, World's Record Super 9, Shield Grid 9B, AW13, AW19, AW27, pointer dial Philharmonic, any Scott in these cabinets: Secretaire, Napier, Warwick, Ravinia Grande, Laureate Grande. Also want original literature, especially issues of THE SCOTT NEWS. Contact me first if you have anything SCOTT to sell. Jim Clark, 1292 Starboard, Okemos, MI 48864. (517) 349-2249.

WANTED — SONY

WANTED: OLD SONY radios. Jay Lewin, 400 east 54th Street, New York, NY 10022. (212) 935-5656.

WANTED — TEN TEC

WANTED: ANYTHING BY TEN TEC. Please state price and condition; condition unimportant: Herman F. Schnur, Rt. B Box 151, Greenville, NC 27858.

WANTED — ZENITH

WANTED— CABINET in good condition for Zenith model 7-S-232 (5709 chassis) along with 8" speaker P/N 49- 203 if available. Jim Briscoe, P. O. Box 327, Shoals, IN 47581. (812) 247-2497.

AUCTION

APPROX. 300 LOTS

Saturday, June 24, 1989, 11:00 AM

Preview 9:00 AM

34555 Center Ridge Rd., N. Ridgeville, OH

(10 miles W. of Cleveland)

From private collections we have purchased, we sell the following:

BATTERY SETS
DeForest D-10, D-12, F-5, Federal, Crosley Pup, Radiola IV, VIII & 21, Radiola IIIa w/internal horn, Operadio w/loop antenna, Zenith Super 7, Michigan MRC-3, AK Breadboard, Western Electric Amp 527W, several 1 and 2 tube sets

HORNS & SPEAKERS
Western Electric 560 AW, AK, Magnavox, RCA, Thompson and many others

COLLECTIBLE TUBES
Several lots including W.E., Welsh, WD-11's, 12's, Arcturus, DeForest.

CATALINS, BAKELITES, METAL
Bendix 526MC, RCA, Arvin, Fada, Emerson, Crosley, Zenith, Philco

TELEVISIONS
3" Pilot, Gas pump & table model Predictas, Dumont, Zenith portholes.

CATHEDRALS, TOMBSTONES, CONSOLES
At least 15 cathedrals including Philco 70, 16B, 89, 60, 84, Jrs., 50, GE K-52, Crosley, Phoenix, AK, Gloritone, Stewart-Warner; Chrome front Grunow, Zenith consoles, Crosley, AK, Philco, Balkeit, etc.

RADIO & TV ADVERTISING
Banners, signs, neon, lighted.
Zenith, RCA, Motorola, Dumont, Philco.

Much misc. books, catalogs, manuals, magazines, battery parts, etc.
Approx. 300 lots. Sales tax applies. Send $1.00 for complete list.
TERMS: Cash. Checks w/approval of auctioneer or owner.

For more information, contact:

Jerry Canterbury, Auctioneer
5999 Avon Belden
N. Ridgeville, OH 44039
216-327-9394

Vintage TV & Radio, Owner
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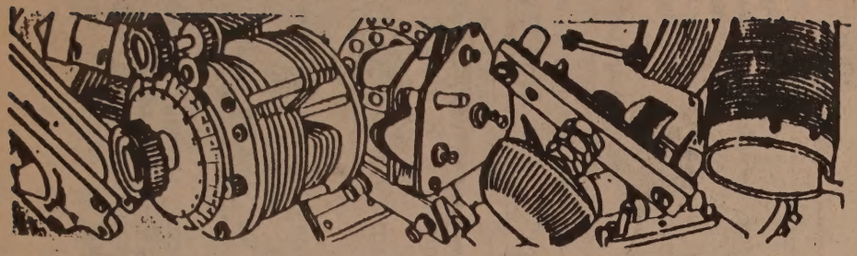
216-671-6712



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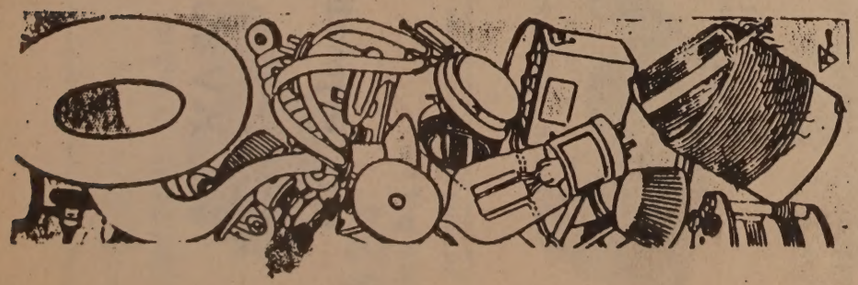

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